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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,696	12/01/2003	Toshiya Hataguchi	70021172-1	2553

7590 07/14/2006

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EXAMINER	
WYATT, KEVIN S	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/725,696	HATAGUCHI ET AL.	
	Examiner	Art Unit	
	Kevin Wyatt	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Rothamel (U.S. Patent No. 6,639,206 B1).

Regarding claim 1, Rothamel shows in Figs. 1, and 6-7 a drum (7, i.e., rotational portion) comprising a cylindrical surface (5, i.e., rotating cylindrical surface) characterized by an axis and a radius of curvature (8, i.e., axis of rotation), said drum having a surface with a normal perpendicular to said axis; a first track (9, i.e., strip) comprising a plurality of alternating reflective (2, i.e., reflectors) and non-reflective (11, i.e., lands) stripes arranged on said cylindrical surface, each reflective stripe having a circular cylindrical outer surface having an axis coincident with said axis of said drum; a first light source (1, i.e., emitter) that illuminates said outer surface of said reflective stripes at an opaque angle relative to said normal; and a first photodetector (3, i.e., detector) positioned to receive light from said light source that is reflected from said reflective stripes of said first track when said drum moves relative to said photodetector, said reflective stripes of said first track forming an image of said first light source on said

first photodetector (col. 5, lines 7-10), said image having a magnification that depends on said radius of curvature.

Regarding claim 5, Rothamel discloses that said cylindrical surface (5, i.e., rotating cylindrical surface) lies between said first track (9, i.e., strip) and said axis (8, i.e., axis of rotation).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rothamel (U.S. Patent No. 6,639,206 B1) in view of Chen (U.S. Patent No. Patent No. 6,817,528 B2).

Regarding claim 2, Rothamel shows in Figs. 1, and 6-7 an encoder comprising: a drum (7, i.e., rotational portion) comprising a circular cylindrical surface characterized by an axis (8, i.e., axis of rotation), said drum having a surface with a normal perpendicular to said axis; a first track (9, i.e., strip) comprising a plurality of alternating reflective (2, i.e., reflectors) and non-reflective stripes (11, i.e., lands) arranged on said circular cylindrical surface, said reflective stripes comprising a portion of a said circular cylindrical surface (col. 5, lines 37-47); a first light source (1, i.e., emitter) that

illuminates said stripes at an oblique angle relative to said normal; and a first photodetector (3, i.e., detector) positioned to receive light (14) from said light source that is reflected from said reflective stripes of said first track forming an image of said first light source on said first photodetector. Rothamel does not disclose that said first light source that emits a collimated beam of light. Chen shows in Figs. 1-2 that said first light source (combination of (VCSEL) unit 202 and convex lens (212)) emits a collimated beam of light (collimated beam (222))(col. 6, lines 36-38). It would have been obvious to one skilled in the art to provide the to provide in Rothamel collimated lenses to collimate light rays for each light source for the purpose of providing a reflected image of light source with greater detail to photodetector for improved detection during drum rotation.

6. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rothamel (U.S. Patent No. 6,639,206 B1) in view of Suganuma (U.S. Patent No. 6,448,996 B2).

Regarding claims 3 and 4, Rothamel discloses the claimed invention as stated above. Rothamel does not disclose that a) said drum rotates about said axis when a shaft is rotated and b) said shaft is coincident with said axis. Suganuma shows in Fig. 1 that a) said drum (14) rotates about said axis when a shaft (18, i.e., axial shaft) is rotated and b) said shaft is coincident with said axis. (col. 8, lines 20-31). It would have been obvious to one skilled in the art to provide the shaft of Suganuma to device of Rothamel for the purpose of rotating the drum of Rothamel.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rothamel (U.S. Patent No. 6,639,206 B1).

Regarding claim 6, Rothamel discloses the claimed invention as stated above. Rothamel does not disclose that said first track lies between a cylindrical surface and said axis. It would have been obvious to one skilled in the art to rearrange components of encoder by placing the encoder tracks between cylindrical surface and said axis for the purpose of providing a more compact design.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rothamel (U.S. Patent No. 6,639,206 B1) in view of Karim-Panahi (U.S. Patent No. 5,4338,882).

Regarding claim 7, Rothamel discloses the claimed invention as stated above. Rothamel does not disclose a) a second track comprising a plurality of alternating reflective and non-reflective stripes arranged on said cylindrical surface; a second light source for illuminating said stripes at an opaque angle relative to said normal; b) and a second photodetector positioned to receive light from said second light source that is reflected from said reflective stripes of said second track, wherein said drum moves relative to said photodetector. Karim-Panahi shows Fig. 1 a) a second track (4, i.e., circumferential band) comprising a plurality of alternating reflective and non-reflective stripes arranged on said cylindrical surface (2, i.e., rotating shaft); a second light source (5, i.e., light source) for illuminating said stripes at an opaque angle relative to said normal; b) and a second photodetector (8, i.e., photodetector) positioned to receive light from said second light source (5, i.e., light source) that is reflected from said reflective stripes of said second track (4, i.e., circumferential band), wherein said drum (2, i.e.,

rotating shaft) moves relative to said photodetector. It would have been obvious to one skilled in the art to provide in Rothamel the second track of alternating reflective non-reflective stripes, the second light source, and the second photodetector of Karim-Panahi for the purpose of collecting more data on the periodic motion of rotating member.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rothamel (U.S. Patent No. 6,639,206 B1) in view of Karim-Panahi (U.S. Patent No. 5,4338,882), and Cohen (U.S. Patent No. 4,124,839).

Regarding claim 8, the combination of Rothamel and Karim-Panahi discloses the claimed invention as stated above. The combination of Rothamel and Karim-Panahi does not disclose that said reflective stripes of said second track have widths that are different from said reflective stripes of said first track. Cohen shows in Fig. 4 cylindrical drum comprising six encoding tracks (170-180) comprising stripes of varying widths. It would have been obvious to one skilled in the art to modify the combination of Rothamel and Karim-Panahi by placing additional encoding tracks on the cylindrical drum as taught by Cohen for the purpose of providing additional encoding data to the system (column 9, lines 23-27).

Response to Arguments

11. Applicant's arguments filed on 04/24/2006 have been fully considered but they are not persuasive.

In response to applicant's argument regarding claim 1 that Rothamel teaches that the reflectors are planar (cited in col. 4, lines 4-16), the examiner points to Figs. 6-7 wherein the surface of the reflectors 2 are shaped both convexly and concavely (col. 5, lines 37-47) which in either case represents a circular cylindrical surface.

In response to applicant's arguments regarding claims 1 and 5, that no such teachings in Rothamel disclose that the reflective stripes have a circular cylindrical surface and that the image formed by the reflective stripes has a magnification that depends on the radius of curvature of the cylindrical surface, the examiner disagrees. The teachings in Rothamel which disclose that the reflective stripes have a circular cylindrical surface are found in Figs. 6-7 and col. 5, lines 37-47. In addition, it is inherent that the magnification of the light source depends on radius of curvature the reflective stripes.

In response to applicant's argument regarding claim 2, that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the collimated light source of Chen would provide improved imaging of light source from reflected stripes as indicated in col. 5, lines 50-65. The improved imaging would provide greater detail to the photodetector.

In response to applicant's argument regarding claim 2, that providing a collimated light source to Rothamel would render the invention inoperable, the examiner disagrees. According to Fig. 4, the differential amplifier 20 (which is also used in Figs.6-7) supplies an output signal representing the differences in brightness of the light source reflected from the reflectors 2 in the sensors 3, as the drum rotates. The differences in brightness would represent a detailed image of the light source reflected from the surface of the reflectors.

In response to applicant's argument regarding claim 8 that utilizing different spacings will lead to and inoperable device. The examiner disagrees. First, the Karim-Panahi reference primarily measures the variations in torque of the shaft by comparing the torque in two locations on the shaft marked by the band. According to col. 5, lines 15-20, the wave number k is obtained by measuring phase shift of the respective data streams (pulse trains) of the two channels. The angular velocity Ω and the circular frequency f of the shaft is not affected by the distribution of the markings at any location on the shaft. The preference for having markings line up with each band is general done for convenience (col. 4, lines 2-5). Therefore the resulting output waveforms (the traced distribution of pulses) taken from either channel will have an identical shape. However, the two traces will originate at different times when superimposed on the time division scale if vibration or twisting is present in the shaft. Therefore, utilizing bands with different spacings will not lead to an inoperable device.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Wyatt whose telephone number is (571)-272-5974. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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